

CHAPTER 3

EXTENSION ALTERNATIVES

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CHAPTER 3 RAIL LINE EXTENSION

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CHAPTER 3

RAIL LINE EXTENSION

This chapter presents SEA's additional analysis and evaluation of the portion of the proposed project which would extend the Dakota, Minnesota & Eastern Railroad Corporation's (DM&E's) existing rail system into the Powder River Basin (PRB). Other chapters of this Final EIS, as outlined in Chapter 1.0, discuss SEA's additional analysis pertaining to other components of the proposal (the Mankato connecting track and various community bypasses for example).

This chapter addresses alternatives for extending DM&E's existing system into the PRB, and discusses additional Extension Alternatives to the proposed project suggested in comments received on the Draft EIS. These alternatives include use of the Railroad Rehabilitation and Improvement Financing Program (RRIFP or Program) and an additional D Alternative.

SEA's analysis of the additional Extension Alternatives is presented on a resource-by-resource basis, and compares the potential environmental impacts of each Extension Alternative on natural and human resources. Information in the Draft EIS that remains unchanged is generally not restated, although it may be summarized, and only new impact analyses are presented here. Finally, this chapter presents SEA's recommendations for the environmentally preferred project alternatives for extending DM&E's system into the PRB.

3.1 RAIL LINE EXTENSION ALTERNATIVES IN THE DRAFT EIS

During preparation of the Draft EIS, SEA conducted an extensive review of alternatives, including consideration of Extension Alternatives:

- Proposed by DM&E in its Application to the Board (Alternative B),
- Developed by DM&E subsequent to filing its Application to avoid environmentally sensitive areas (Alternative C, Phiney Flat Segment, and WG Divide Segment), and
- Identified during the scoping process (D Alternatives).

In all, nine Extension Alternatives (not including minor variations in the Spring Creek and Hay Canyon areas) and the No-Action Alternative were evaluated in the Draft EIS for reasonableness and feasibility.

As the lead Federal agency with decision-making authority for the project, the Board selects the alternative that satisfies its legal and regulatory responsibility to consider not only environmental impacts but also economic, engineering, and other applicable factors related to the project. In this case, the purposes of the proposed project are to rehabilitate DM&E's existing rail line and provide competitive rail access to the mines in the PRB. The Board's regulatory

responsibility requires it to consider whether the project furthers rail competition, is financially viable, protects rail service to existing shippers, and meets a public need. Under the Interstate Commerce Commission Termination Act of 1995 (ICCTA), construction applications are to be approved unless they are inconsistent with the public interest (49 U.S.C. 10901(c)).¹ The Board may (1) approve a transaction as proposed; (2) approve it with conditions, including environmental conditions, to offset or reduce its potential impacts; or (3) disapprove the transaction entirely.²

On December 10, 1998, based on the record developed to that point, the Board found that DM&E's proposal satisfied the transportation aspects of 49 U.S.C. 10901, but explained that final approval awaited the completion of the environmental review process and its assessment of potential environmental effects and the costs of environmental mitigation that it might impose. The Board said it would issue a final decision on the project following completion of the EIS process, and that no new construction could begin until the final decision approving it was effective.

One of the purposes of an EIS is to develop environmental mitigation to minimize or eliminate environmental impacts discovered during the course of the environmental review. In a case in which environmental impacts are so severe that they cannot be mitigated effectively, however, the Board can still decide to approve the project under NEPA provided it has adequately considered the potential environmental impacts in an EIS.

In establishing feasible alternatives, SEA considered factors such as rail line design and engineering constraints, operation and maintenance costs, and potential environmental impacts. Both alternatives supported and those opposed by the Applicant were considered. In addition, to meet the requirements of the USFS, SEA also evaluated potential alternatives for detailed analysis

¹ In enacting ICCTA, Congress intended to facilitate rail line construction by changing the statutory standard for approval. Previously approval was required if the agency found that a project was consistent with public convenience and necessity; now approval is required unless the agency finds that the project is inconsistent with public convenience and necessity. The Board noted in its December 10, 1998 decision (*Dakota, Minnesota & Eastern Railroads Corporation Construction into the Powder River Basin*, STB Finance Docket No. 33407 (STB served December 10, 1998) (STB Decision), at 17) that "[u]nder the revised statute, proposed rail constructions are to be given the benefit of the doubt."

² Board-imposed conditions, including environmental mitigation, must be directly related to the transaction, reasonable, and supported by the record. The Board does not require mitigation of pre-existing environmental impacts, such as those resulting from existing railroad operations or land development.

that would not require new rail line construction across USFS lands. This screening resulted in retention of four primary alternatives for detailed analysis in the Draft EIS:

- Alternative A - No Action.
- Alternative B - Applicant's Proposed Alternative, DM&E's preferred alternative in its Application to the Board.
- Alternative C - Applicant's Modified Proposed Alternative, developed by rerouting portions of Alternative B to avoid environmentally sensitive areas.
- Alternative D - Existing Transportation Corridors Alternative.

SEA concluded in the Draft EIS that Alternative A (No-Action) could potentially have significant impact on safety and rail shipper service, would not satisfy the purpose and need for the project, and no mitigation measures could reduce these impacts. SEA determined that Alternative D, selected because it most efficiently used existing rail corridors and avoided construction on USFS lands even though it was longer than the other Extension Alternatives, would have more significant impacts, many of them difficult to mitigate, than Alternatives B and C, and appeared not to satisfy the project's purpose and need. Alternative C would generally have lesser, although still significant, impacts than Alternative B. Because Alternative C appeared to have the least potential environmental impact and would meet the purpose and need for the project, Alternative C was determined to be the least environmentally intrusive (See Chapter 6 of the Draft EIS for a detailed discussion).

SEA received many comments on the alternatives analyzed in the Draft EIS, and suggestions for alternatives not evaluated in detail in the Draft EIS. Among these suggestions were that the RRIFP be used, and that an additional existing rail corridor alternative, similar to Alternative D-6 from the Draft EIS, be evaluated as well. In preparing this Final EIS, SEA analyzed these alternatives in detail, and the results are discussed in the following sections.

3.1.1 RAILROAD REHABILITATION AND IMPROVEMENT FINANCING PROGRAM

The Transportation Equity Act for the 21st Century (TEA 21), Public Law No. 105-178, passed in June of 1998, amended Title V of the Railroad Revitalization and Regulatory Reform Act of 1976. Section 7203 of TEA 21 has new guidelines for the Secretary of Transportation's provision of direct loans and loan guarantees for rail-related projects to state and local governments; government-sponsored authorities and corporations; railroads; and joint ventures including at least one railroad. This revised program is referred to as the Railroad Rehabilitation and Improvement Financing Program (RRIFP or Program).

The Secretary has delegated to the Federal Railroad Administration (FRA) his authority under the Program to fund projects for:

- Acquisition, improvement or rehabilitation of intermodal or rail equipment or facilities, including tracks, components of tracks, bridges, yards, buildings and shops;
- Refinancing outstanding debt incurred for these purposes; and
- Development or establishment of new intermodal or railroad facilities.

FRA gives priority to projects that enhance public safety and the environment, promote economic development, enable U.S. companies to be more competitive internationally, are endorsed by plans prepared under 23 U.S.C. 135 by the state or states in which they are located, and preserve or enhance rail or intermodal service to small communities or rural areas.

Designed as a last resort source of credit, the RRIFP helps railroads fund otherwise unaffordable projects. It requires that a railroad submit a letter from a lender that has extended it credit within the previous five years, but refuses financing for the applicant's proposed project. FRA determines whether financial assistance is justified by present and future demand for the service the project will provide; whether the railroad's obligation can be repaid within 25 years, based on an appropriate combination of credit-risk premiums and collateral; and whether the project is consistent with the purposes of the program and will economically and efficiently utilize the funds. Because Congress has not yet appropriated funds for administration, FRA requires applicants to pay a credit-risk premium, providing FRA funding to administer the loan. FRA obtains RRIFP monies from the U.S. Department of Treasury for loans to borrowers, which, through credit-risk premiums and loan payments, repay the loan to FRA.

The RRIFP's loans outstanding may not exceed \$3.5 billion, so that new loans can only be made when unpaid principal falls below \$3.5 billion. Of this total, \$1.0 billion is reserved for projects proposed by railroads other than Class I railroads,³ so that nearly 700 Class II and Class III railroads are eligible for these funds. The Program has no restrictions on how much a railroad may borrow, nor how often it applies.

³ As noted in the Draft EIS, railroads are classified by the Board according to average annual operating revenues (AAOR). Class I railroads have AAOR of \$256.4 million or more; Class II railroads have AAOR of between \$256.4 million and \$20.5 million; and Class III railroads have AAOR of less than \$20.5 million. DM&E is a Class II railroad.

During the Draft EIS comment period, SEA received many suggestions that the RRIFP be used to finance rehabilitation of DM&E's existing rail line. In evaluating the proposed project's eligibility for this funding, SEA notes that DM&E's identified purpose and need to rehabilitate its existing rail line seems consistent with the intent of the RRIFP. DM&E proposes rehabilitation to improve the safety of the rail line, promote economic development, and enable DM&E's existing shippers to compete more effectively in the international market place, as discussed in detail in the Draft EIS. However, it would not satisfy the other identified purpose of providing additional, competitive rail access into the PRB.

DM&E's Application to the Board states that rehabilitation of its existing rail line (about 597.8 miles across Minnesota and South Dakota) would cost approximately \$875.75 million in 1997 dollars. This includes new passing siding (\$105.55 million) and improvements to existing yard facilities (\$110.94 million) that, while boosting the efficiency of DM&E's operation, might not be necessary if not for potential increases in rail traffic associated with the proposed project. The estimate for rehabilitating DM&E's existing rail line, adjusted to 2001 dollars, ranges from \$725 to more than \$960 million, which is 72.5 to 96.0 percent of the total \$1.0 billion in funding available to non-Class I railroads through the RRIFP. SEA's informal inquiries indicate that FRA is unlikely to approve such a large loan for a single railroad when several hundred railroads could otherwise benefit from the funds available through the Program.

SEA also evaluated DM&E's potential for repaying any funds borrowed through the RRIFP. Assuming a 25-year loan term (for the lowest monthly payment), and an average Federal interest rate of 3.5 percent, DM&E's monthly payment could be \$3.63 million (on \$725 million) to \$4.82 million (on \$960 million), or \$43.56 to \$57.8 million per year. With annual revenues of \$50 to \$60 million, DM&E could be forced to default since, even if its revenues cover loan payments, remaining revenues would not cover operation and maintenance. While after rehabilitation DM&E could cut operating and maintenance costs by deferring track maintenance to cover its loan payments, deferral would soon result in deteriorating track and, within a few years, DM&E's situation would be similar to today's. Without a dramatic increase in revenues which is not anticipated from simply rehabilitating the existing line, the benefits would be lost within a few years, probably resulting in restricted train operation (weights, speeds) and safety concerns throughout the system.

It may be argued that DM&E could target just those parts of its system in most need of rehabilitation for more manageable loan payments. However, for DM&E and its shippers to realize the benefits of rail line rehabilitation, the improvements must be system-wide for improved safety and to allow operation of 286,000 pound rail cars throughout the system. System-wide upgrade would involve several hundred miles of track and cost several hundred million dollars.

To continue the current “band-aid” approach to rehabilitation could reduce loan payments, but likely would neither generate additional revenue nor produce sufficient system-wide improvements to result in long-term benefits to rail operations or shippers.

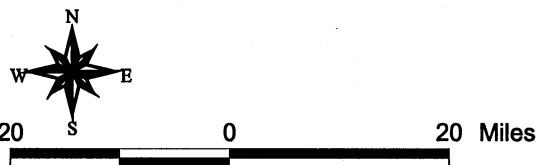
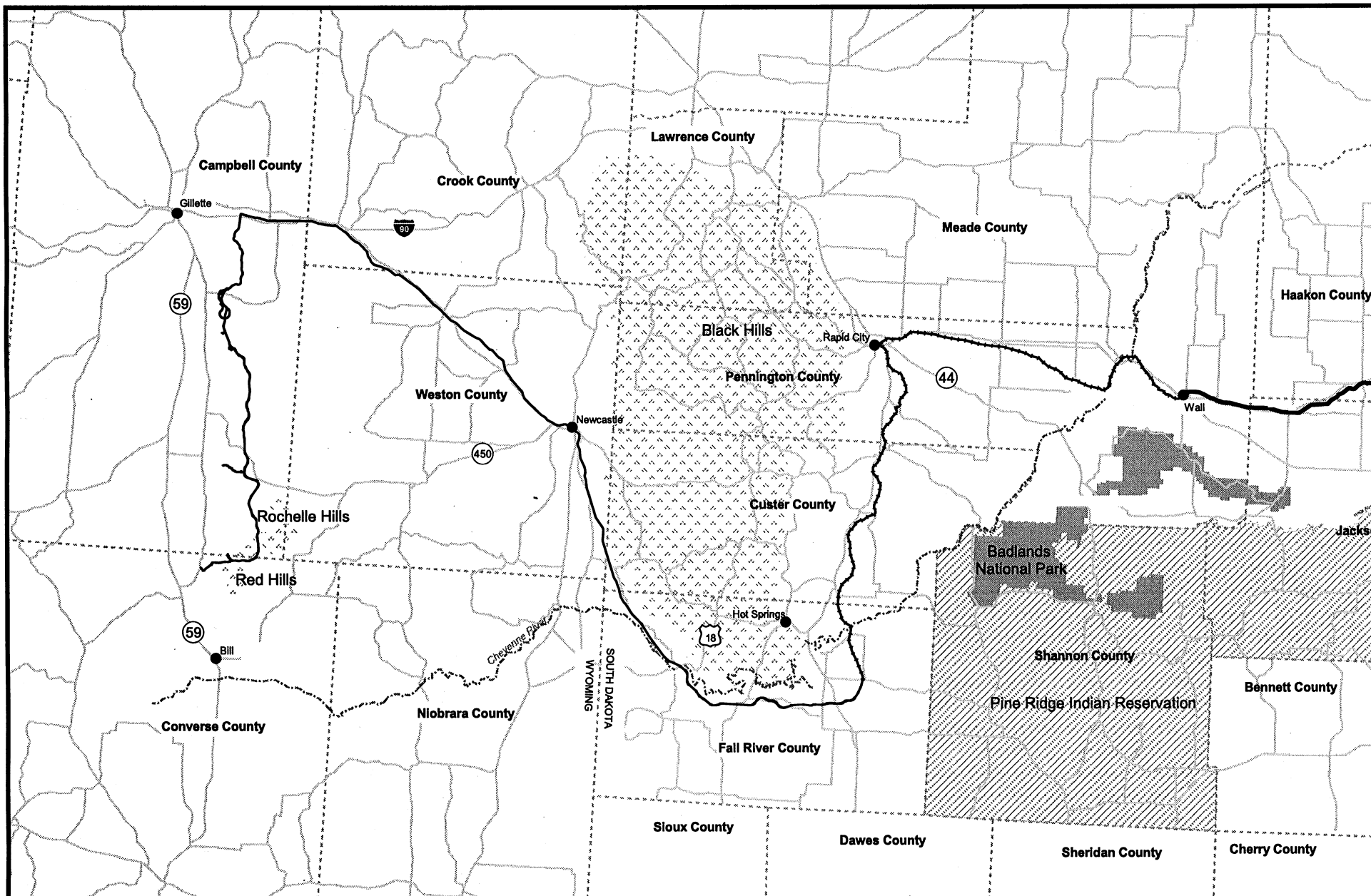
In short, although at first glance the RRIFP would seem a reasonable way for DM&E to seek funds to rehabilitate its existing line,⁴ it is unlikely that the Program could even lend funds sufficient to accomplish the system-wide improvements needed to reestablish DM&E as a safe and efficient railroad, that DM&E could repay the loan and still operate responsibly, or that a more affordable loan for less than the full need would achieve the railroad’s goal. After due consideration, SEA has determined that the RRIFP is not a reasonable, practicable, or possible funding method for the rehabilitation of DM&E’s existing line.

3.1.2 MODIFIED ALTERNATIVE D

During the scoping phase of this project (before the Draft EIS phase), SEA received suggestions that existing transportation corridors – existing rail lines operated by DM&E and other rail carriers and roadways – be used to achieve DM&E’s transportation objectives. In addition, the USFS requested evaluation of an alternative that would use existing transportation corridors, as practicable, to minimize impact to the National Grasslands in South Dakota and Wyoming. SEA recognizes that using existing lines and transportation corridors generally is preferable to constructing new ones, provided that it does not increase overall impacts to the environment, require questionable engineering techniques to cope with existing facilities, or require impractically indirect routes between shippers and users. In the Draft EIS, SEA developed and evaluated seven alternatives using existing transportation corridors. Of these seven, SEA determined that Alternative D-7 (Figure 3-1), could potentially efficiently utilize existing corridors and minimize impacts to the National Grasslands, and it was therefore retained for detailed evaluation as Alternative D in the Draft EIS.

Alternative D would utilize existing DM&E main line from Wall, South Dakota, westward to Rapid City. From there it would follow a DM&E secondary rail line south to Smithwick, then branch westward from the existing DM&E line, requiring new rail alignment construction. North of Edgemont, South Dakota, Alternative D would run adjacent and parallel to the existing BNSF rail line north, through Newcastle, Moorcroft, and Upton, Wyoming, continuing alongside the BNSF rail line to access the coal mines south of Gillette, Wyoming. This portion of Alternative D would require construction of new rail line on new right-of-way, generally immediately adjacent

⁴ DM&E has actually applied for funds under the RRIFP, to maintain parts of its existing rail line, and it covers projects not contemplated as part of the PRB Expansion Project.



- Existing Rail Line
- Alternative D-
new construction
- Alternative D-
along existing line

Figure 3-1
POWDER RIVER BASIN EXPANSION PROJECT
Alternative D

to the existing BNSF right-of-way. Although Alternative D would use existing DM&E rail line between Wall and Smithwick, the portion of the alternative between Rapid City and Smithwick would require major reconstruction to allow safe and efficient rail operations.

In the Draft EIS, SEA concluded that the existing DM&E rail line south from Rapid City to Smithwick was unsuitable for operation of unit coal trains as presently configured, and would require major construction to straighten curves and level the grade. Even with this major construction, SEA determined that it might not be possible to develop a suitable alignment for that portion of Alternative D. Since Alternative D is approximately 100 miles longer than the other alternatives, it also did not appear to SEA to meet DM&E's need to create a shorter rail route into the PRB. Moreover, SEA stated that as Alternative D relies on existing rail line corridors, deviations from these existing rights-of-way would reduce the potential benefits associated with following an existing rail corridor and would likely increase its overall impacts. SEA determined that Alternative D presented little flexibility to avoid significant environmental resources along these existing rail lines, with potentially significant environmental impacts to safety, land use, soil, paleontological resources, water resources, wetlands, air quality, noise, cultural resources, and aesthetics. SEA concluded that these impacts would be greater and affect more resources than those of Alternatives B or C. Based on the results of its analysis, SEA eliminated Alternative D as an environmentally preferable alternative in the Draft EIS.

Commenters expressed concerns that by choosing an existing corridor alternative that would greatly increase total project mileage, SEA prejudiced the likelihood that this alternative would be selected as being preferred. While these comments challenged SEA's conclusions and its retention of only Alternative D-7 (and not the other 6 D Alternatives), they suggested no alternatives that would make a D Alternative more environmentally acceptable.

In comments on Alternative D, EPA did not dispute SEA's conclusion that the additional mileage of Alternative D significantly increased its potential impacts, particularly to wetlands and other water resources. EPA also recognized that Alternative D's increased project mileage would reduce DM&E's competitiveness and efficiency, perhaps making it more difficult to obtain coal transport contracts. EPA suggested evaluation of another D Alternative, called Modified D here, similar to Alternative D-6 in the Draft EIS. EPA's proposed alignment would use DM&E's existing rail line west from Wall, South Dakota and south from Rapid City, but would bypass Rapid City, eliminating both potential operational constraints within Rapid City and environmental impacts of realignment and increased rail operations in the City.

Specifically, Modified D would use DM&E's existing rail line south to Smithwick, then branch off to follow the alignment of Alternative C. Rather than follow the BNSF rail line at Edgemont, as Alternative D would, Modified D would continue along the alignment of Alternative C westward to access the mines. EPA reasoned that following the Alternative C alignment from Smithwick to the mines would shorten Alternative D's overall length and might avoid the environmental impacts associated with both the additional mileage and passing through several towns.

In response to comments from EPA and others, SEA began extensive discussions with EPA. These discussions focused initially on the feasibility of upgrading DM&E's existing Rapid City to Smithwick line for unit coal trains. EPA agreed with SEA's determination that the existing line would require substantial construction to be suitable for unit coal trains. EPA noted, however, that use of Alternative C would also require substantial construction effort and questioned whether work done within an existing corridor could reduce the environmental impacts of constructing Alternative C. EPA recommended that SEA evaluate the cut and fill required for each Extension Alternative before determining the feasibility of upgrading DM&E's existing line from Rapid City to Smithwick. EPA suggested that, if Modified D proved feasible, SEA should issue a Supplemental Draft EIS further comparing potential environmental impacts of Alternatives B, C, D, and Modified D.

Working cooperatively, SEA and EPA developed a procedure for appropriate analysis to determine the feasibility of a Modified D alignment. This procedure included development of an alignment and gradeline for Modified D meeting EPA's criteria, similar to DM&E's, of a one percent grade suitable for movement of unit coal trains up to 49 miles per hour, that includes a bypass of Rapid City. This analysis would provide the cut and fill requirements for Modified D, which then could be compared to those of Alternatives B and C to determine the feasibility of Modified D.

3.1.2.1 Development of Alignment for Modified D

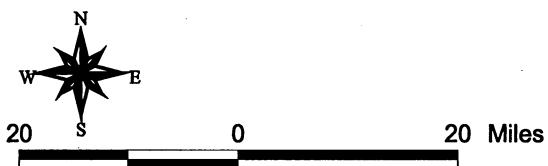
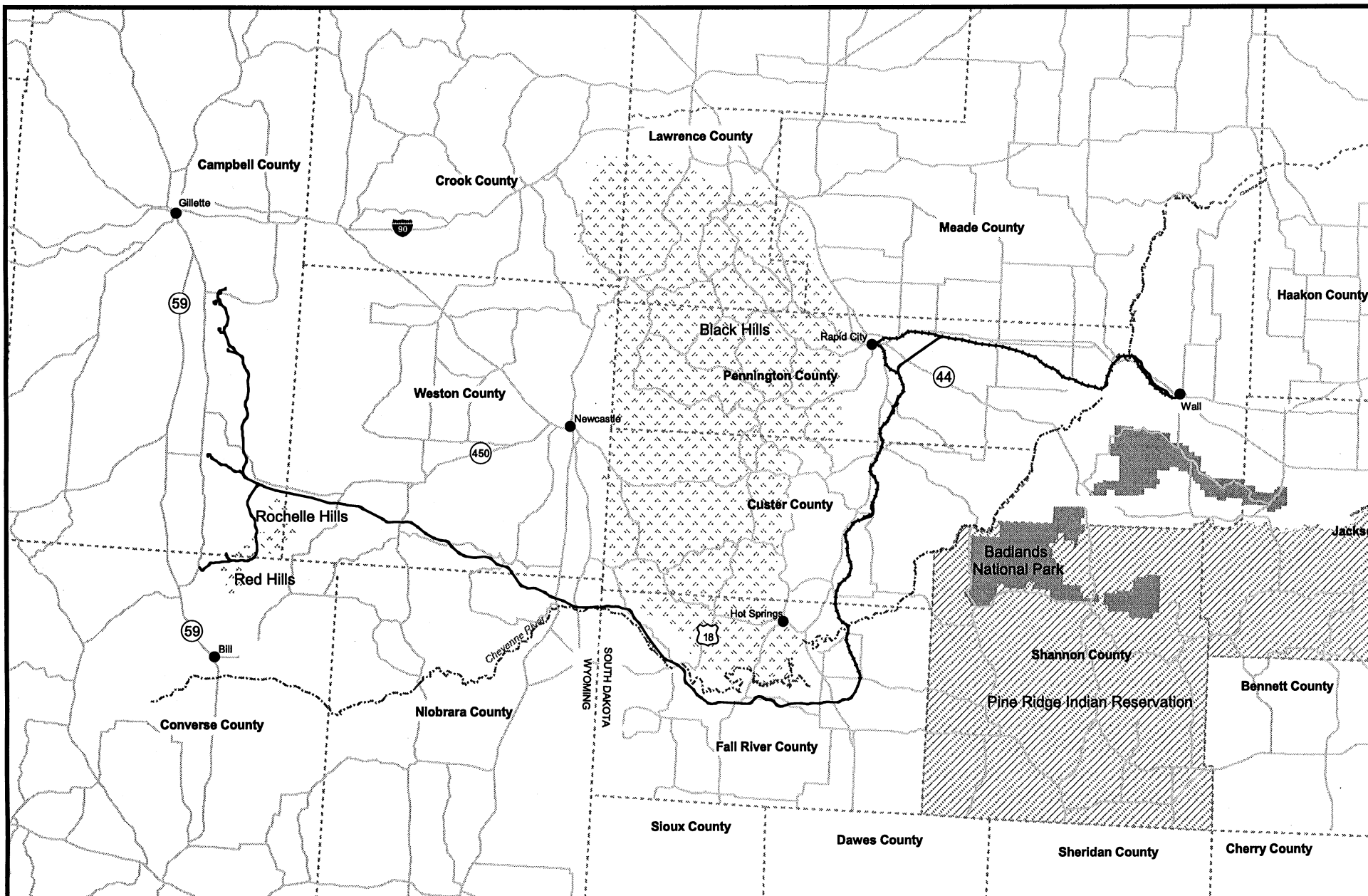
SEA then analyzed Modified D's engineering (cut-and-fill requirements) and environmental considerations. For a thorough analysis of the potential impacts of this alternative, SEA directed DM&E to prepare preliminary design drawings for Modified D between Wall and Smithwick, including a bypass of Rapid City. DM&E developed an alignment complying with its design criteria and EPA's, using existing right-of-way where practical. However, straightening the line to

minimize reverse curves⁵ often took the rail line outside DM&E's existing right-of-way. DM&E's new alignment bypassed Rapid City as outlined by EPA, while making maximum use of its existing right-of-way. When SEA decided that DM&E's alignment appeared reasonable, DM&E completed development of the proposed Modified D.

A detailed description of each segment of the alignment of Modified D follows Table 3-1, which provides a more detailed description of Modified D (Figure 3-2). Detailed maps showing the alignment of the Modified D bypass of Rapid City and significant realignments of the existing rail line are provided in Figures 3-3 to 3-17. Other maps of Modified D are included in the Draft EIS (Volume V) as part of either Alternative C or D.

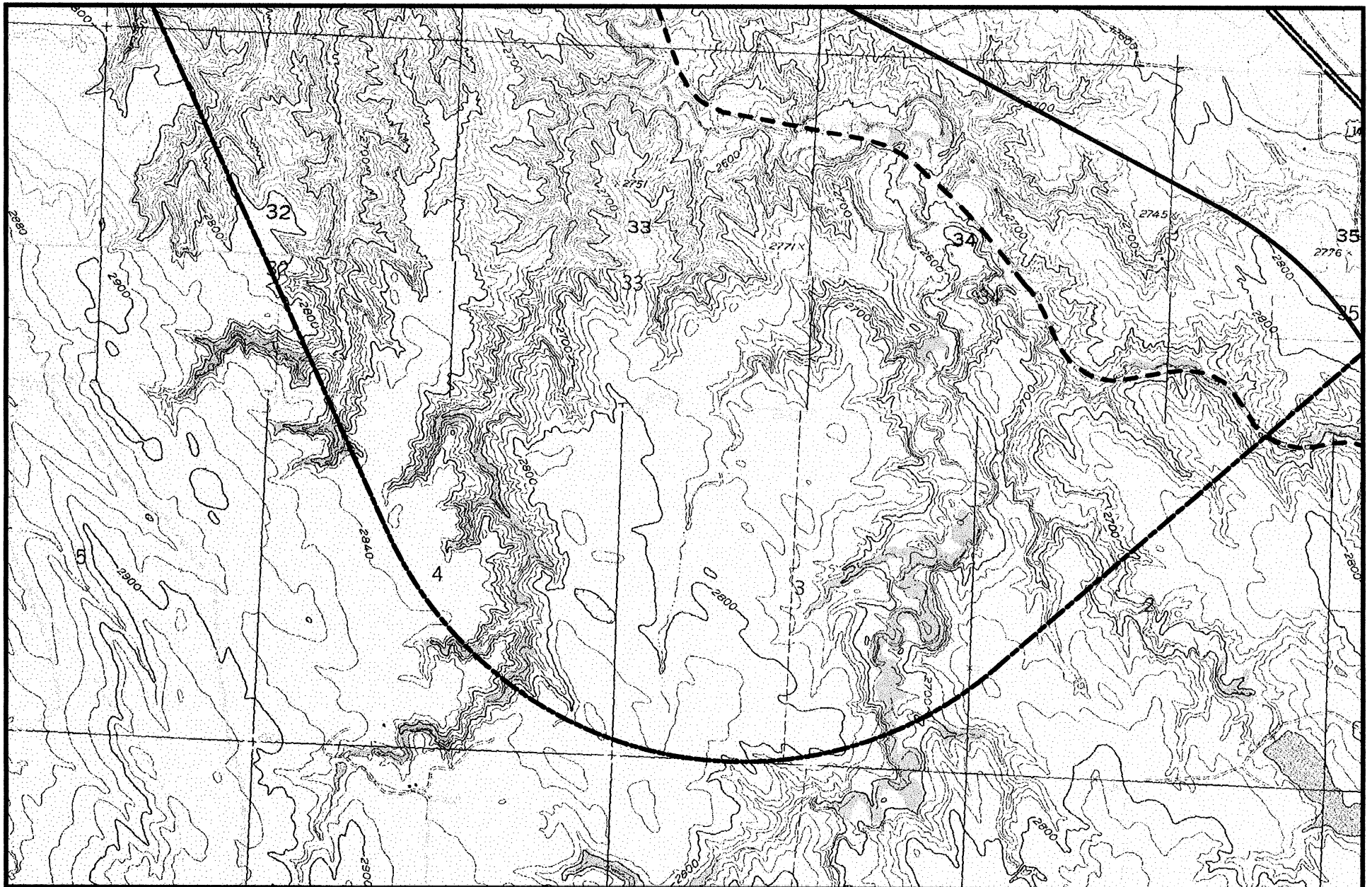
<p>Table 3-1 Modified Alternative D Segments</p>		
Segment	Start	End
Boxelder Creek Segment (44.9 miles)	About 0.5 mile north of Wall	Section 26, T2N, R9E, about 3.0 miles east of Box Elder
Rapid City Bypass Segment (10.2 miles)	Section 26, T2N, R9E, about 3.0 miles east of Box Elder	Center of Section 27, T1N, R8E, about 1.0 mile north of Warbonnet
Warbonnet Segment (56.5 miles)	Center of Section 27, T1N, R8E, about 1.0 mile north of Warbonnet	Section 31, T8S, R8E, just north of Smithwick
Smithwick Segment (13.1 miles)	Section 31, T8S, R8E, just north of Smithwick	Section 29, T9S, R6E, west of Dry Creek
Tepee Creek South Segment (3.7 miles)	Section 29, T9S, R6E, west of Dry Creek	SW corner of Section 23, T9S, R6E
Heppner Segment (3.1 miles)	SW corner of Section 23, T9S, R6E	Section 29, T9S, R5E, SW of Heppner
Hat Creek North Segment (7.3 miles)	Section 29, T9S, R5E, SW of Heppner	Section 25, T9S, R3E at Plum Creek

⁵ Reverse curves occur where a curve turns in one direction and the next turns in the opposite. DM&E redesigned areas where the train would pass through two or more reverse curves at the same time, pulling the cars in several directions at the same time, which increases the possibility of train derailment.



————— Modified D
 - - - - - Existing DM&E
 Rail Line

Figure 3-2
 POWDER RIVER BASIN EXPANSION PROJECT
 Modified D

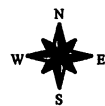
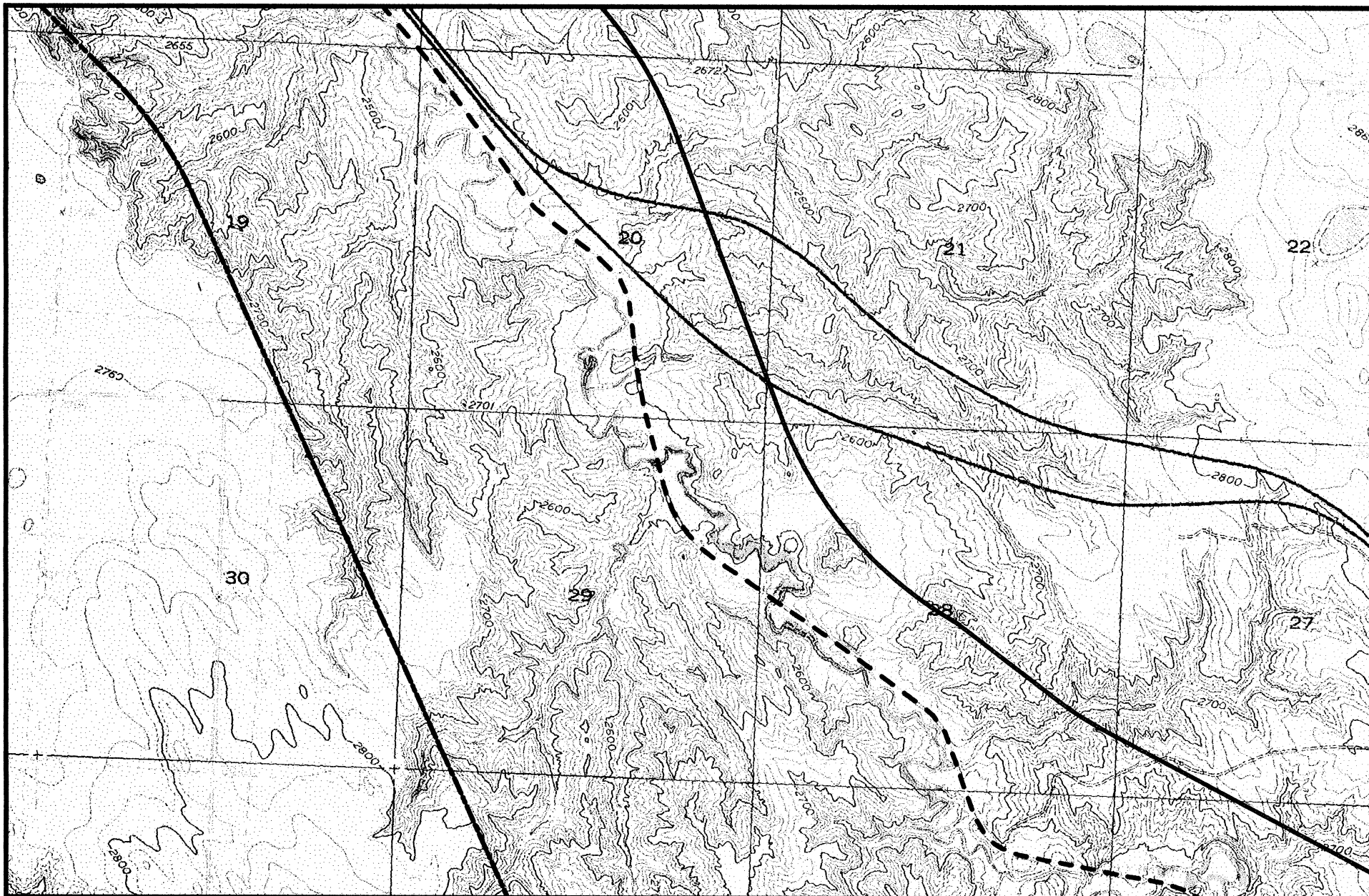


2000 0 2000 Feet

- - - - - Alternative D/Existing Rail Line
- Modified D
- x - x - x - Alternative B & C

Figure 3-4
POWDER RIVER BASIN EXPANSION PROJECT
MODIFIED D ALTERNATIVE
PENNINGTON COUNTY, SD
WASTA SE, QUINN TABLE NE QUADS

* Formerly Chicago and Northwestern Rail Line



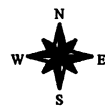
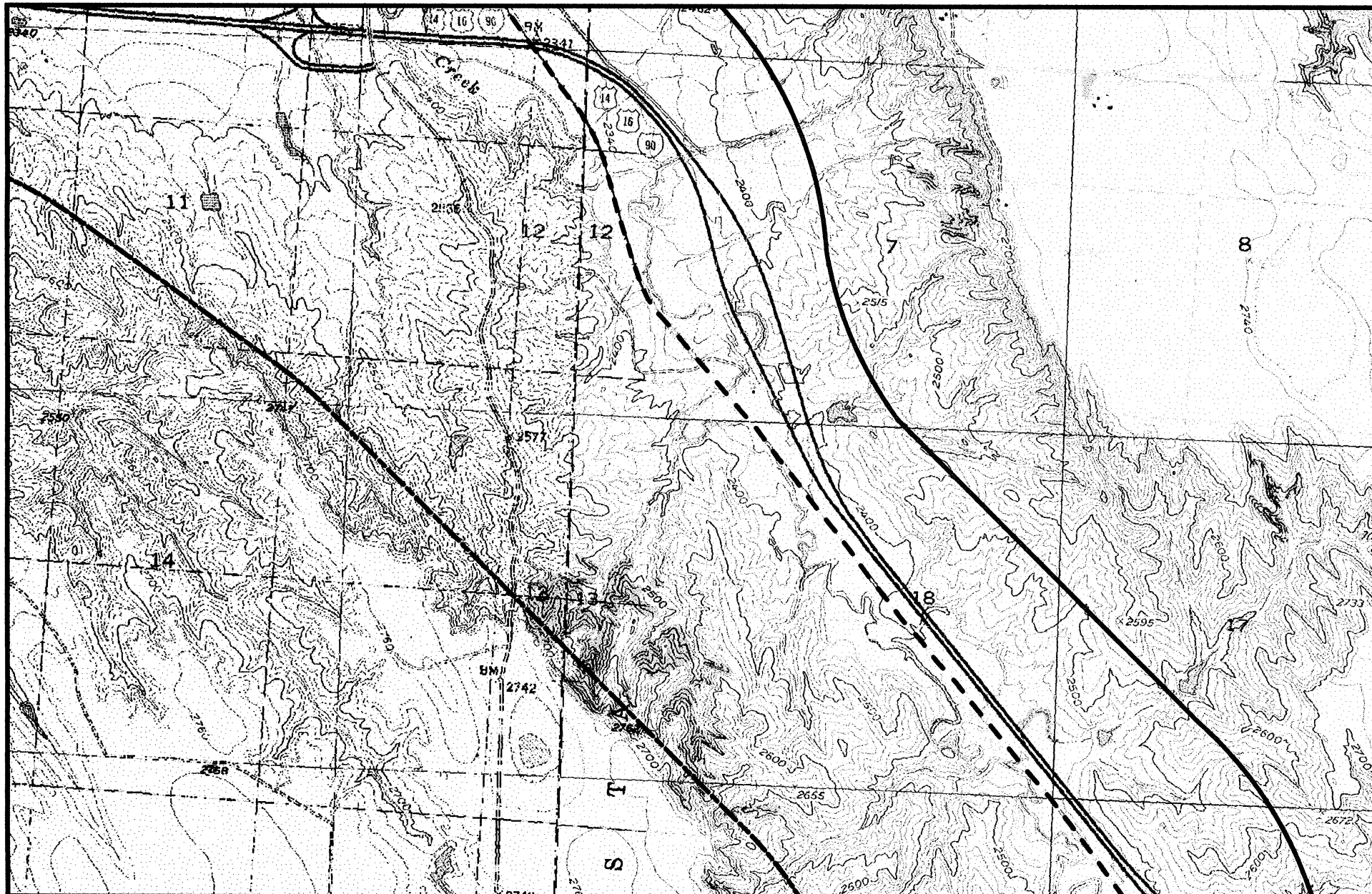
2000 0 2000 Feet



- Alternative D/Existing Rail Line
- Modified D
- Alternative B & C

Figure 3-5
POWDER RIVER BASIN EXPANSION PROJECT
MODIFIED D ALTERNATIVE
PENNINGTON COUNTY, SD
WASTA SE QUAD

* Formerly Chicago and Northwestern Rail Line

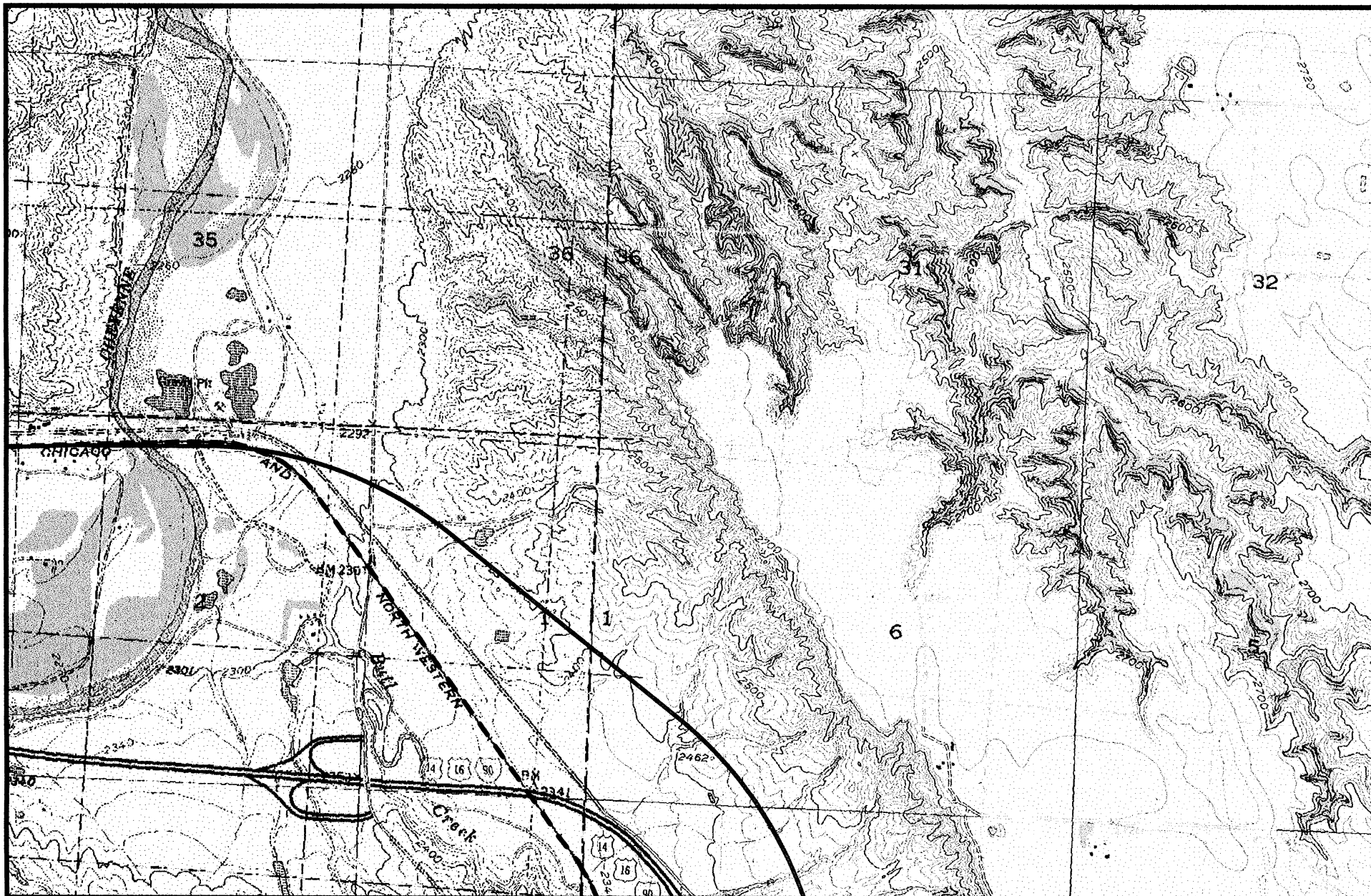


2000 0 2000 Feet

- Alternative D/Existing Rail Line
- Modified D
- Alternative B & C

Figure 3-6
POWDER RIVER BASIN EXPANSION PROJECT
MODIFIED D ALTERNATIVE
PENNINGTON COUNTY, SD
WASTA, WASTA SE QUADS

* Formerly Chicago and Northwestern Rail Line



2000 0 2000 Feet

--- Alternative D/Existing Rail Line
 — Modified D

Figure 3-7
 POWDER RIVER BASIN EXPANSION PROJECT
 MODIFIED D ALTERNATIVE
 PENNINGTON COUNTY, SD
 WASTA, WASTA SE QUADS

* Formerly Chicago and Northwestern Rail Line

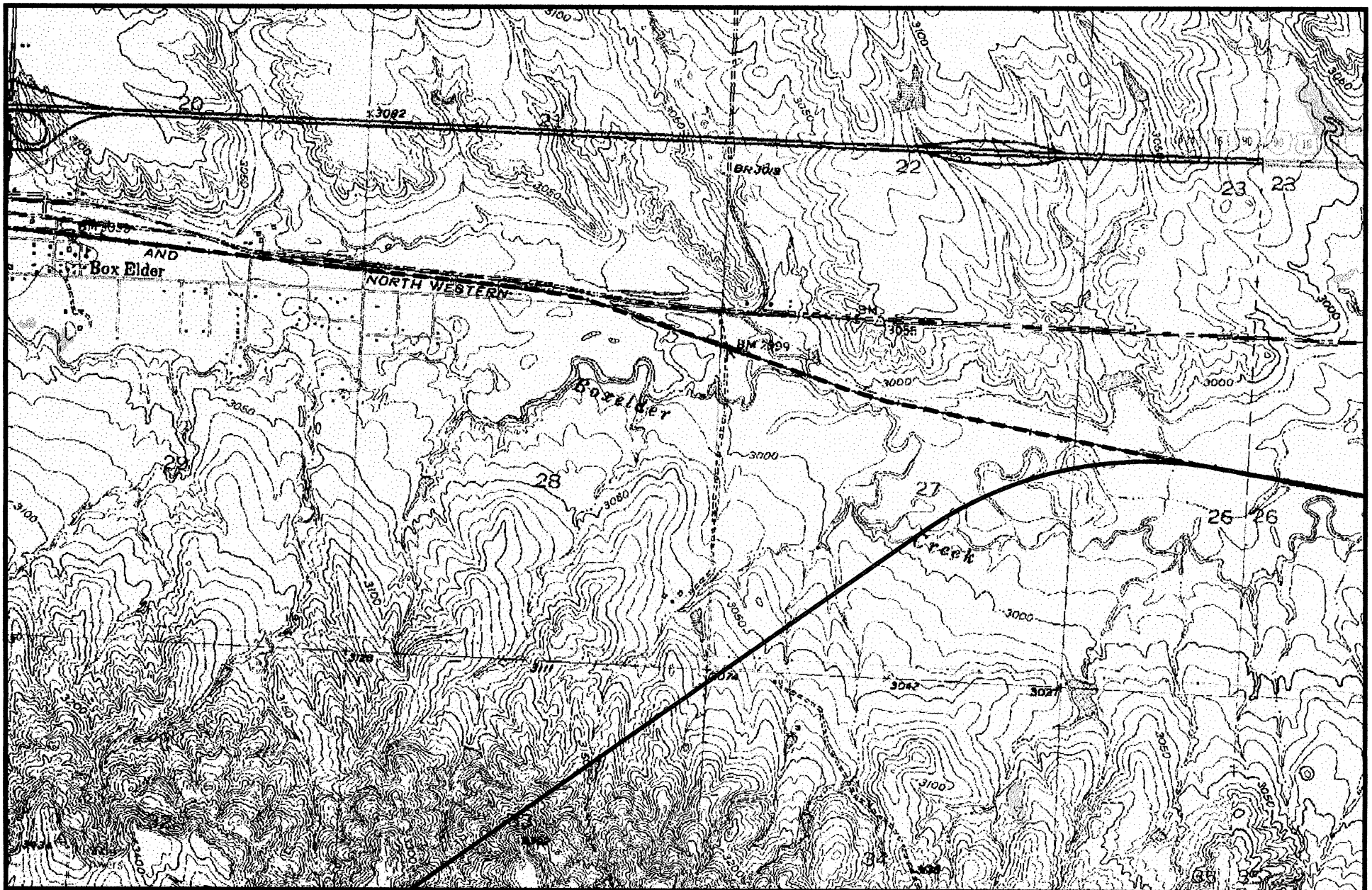
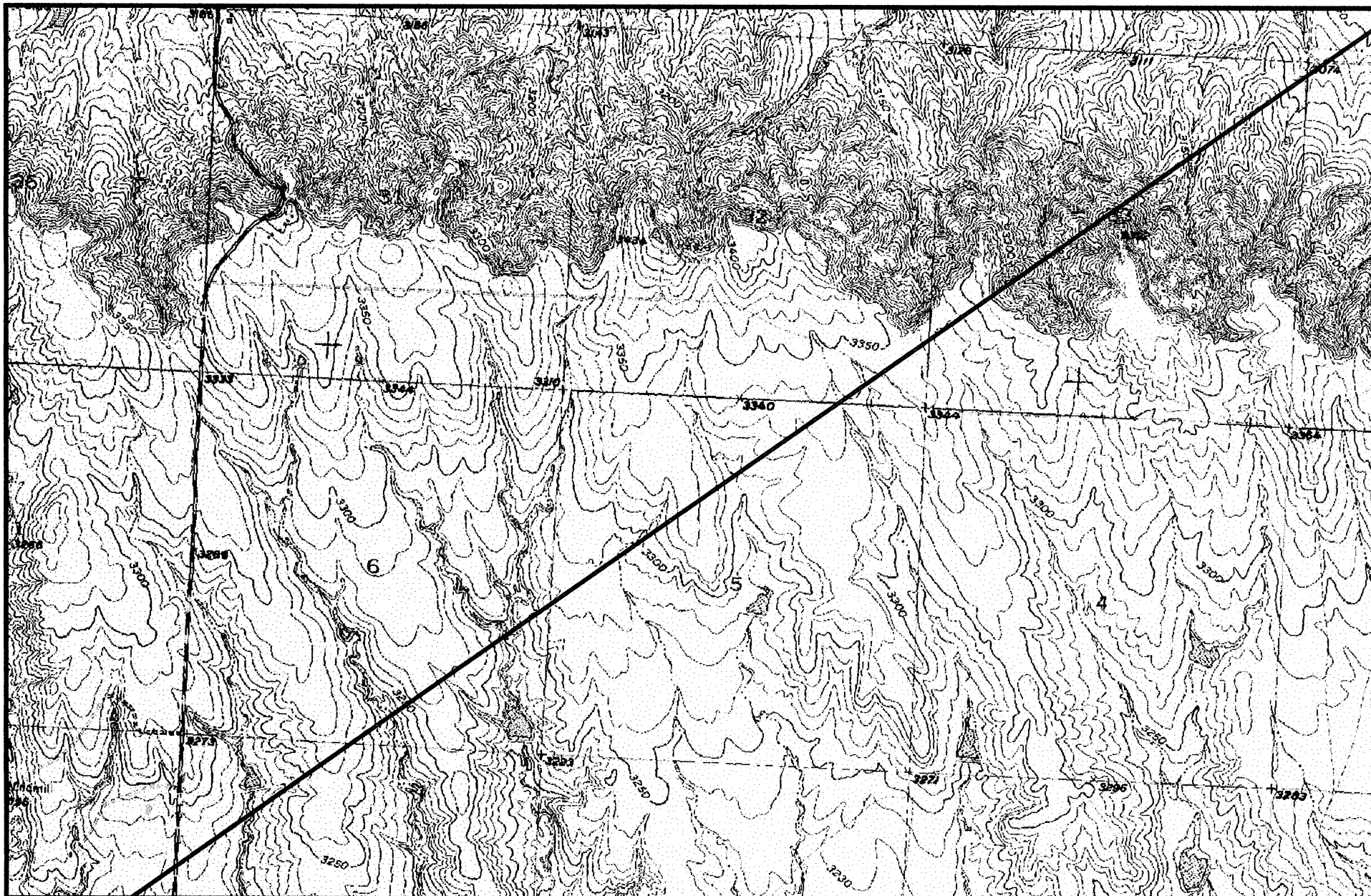


Figure 3-8
POWDER RIVER BASIN EXPANSION PROJECT
MODIFIED D ALTERNATIVE
PENNINGTON COUNTY, SD
BOX ELDER, NEW UNDERWOOD SW QUADS

* Formerly Chicago and Northwestern Rail Line

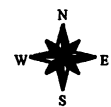
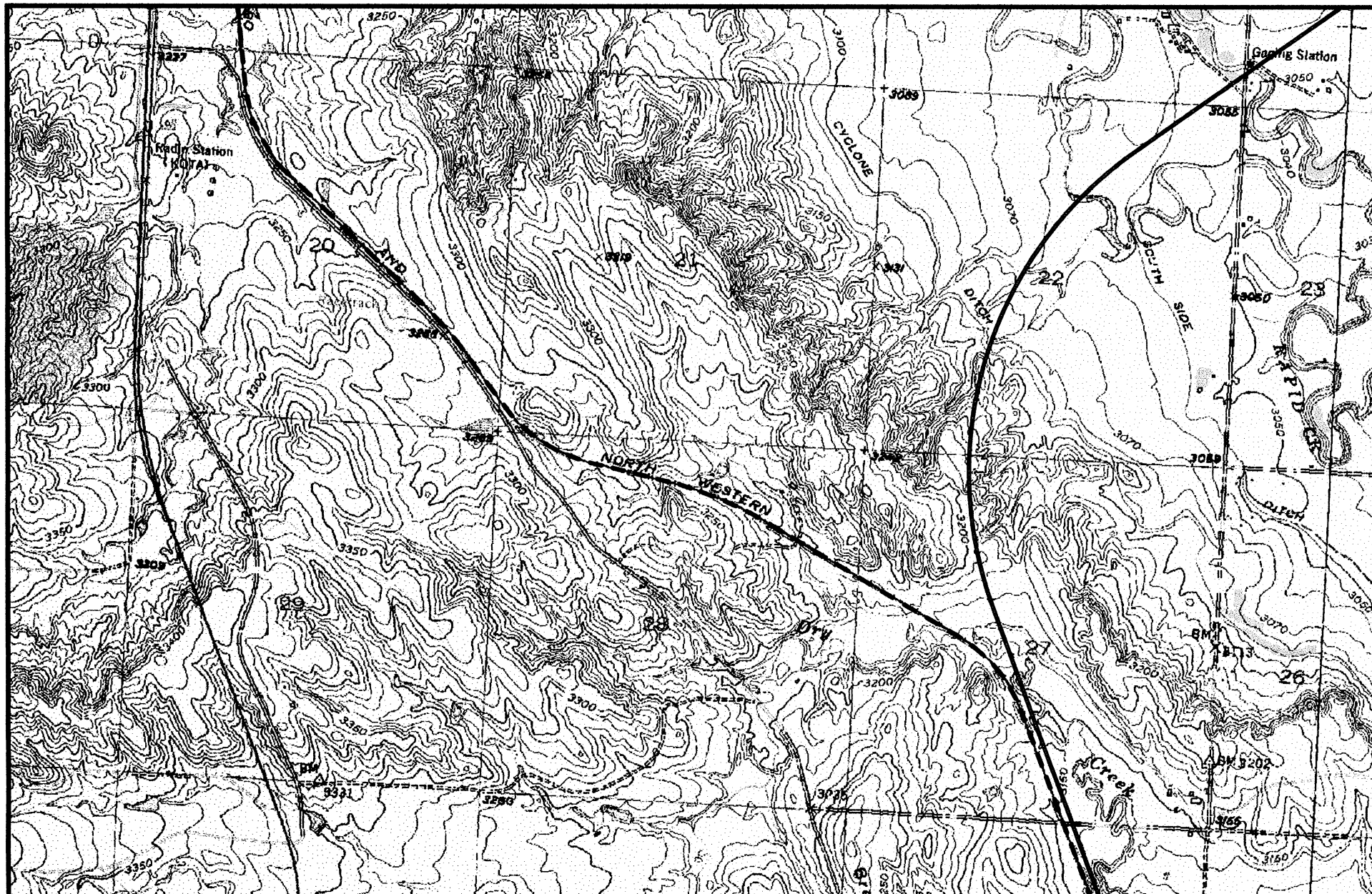


— Modified D

Figure 3-9
POWDER RIVER BASIN EXPANSION PROJECT
MODIFIED D ALTERNATIVE
PENNINGTON COUNTY, SD
BOX ELDER QUAD

* Formerly Chicago and Northwestern Rail Line



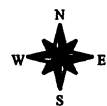
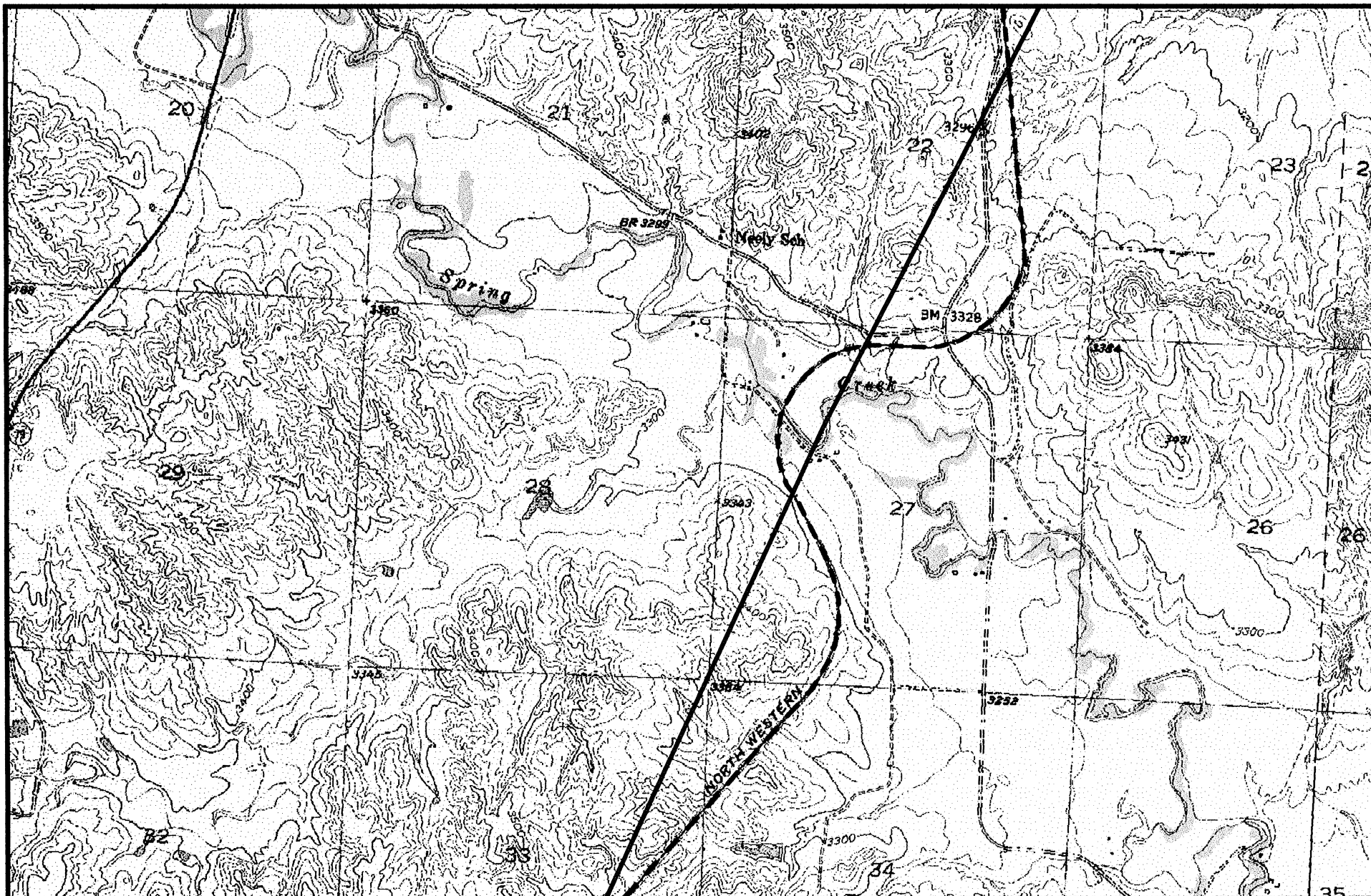


2000 0 2000 Feet

--- Alternative D/Existing Rail Line
 — Modified D

Figure 3-11
 POWDER RIVER BASIN EXPANSION PROJECT
 MODIFIED D ALTERNATIVE
 PENNINGTON COUNTY, SD
 BOX ELDER, RAPID CITY EAST QUADS

* Formerly Chicago and Northwestern Rail Line



2000 0 2000 Feet

--- Alternative D/Existing Rail Line
 — Modified D

Figure 3-13
 POWDER RIVER BASIN EXPANSION PROJECT
 MODIFIED D ALTERNATIVE
 PENNINGTON COUNTY, SD
 HERMOSA NW, HERMOSA NE QUADS

* Formerly Chicago and Northwestern Rail Line

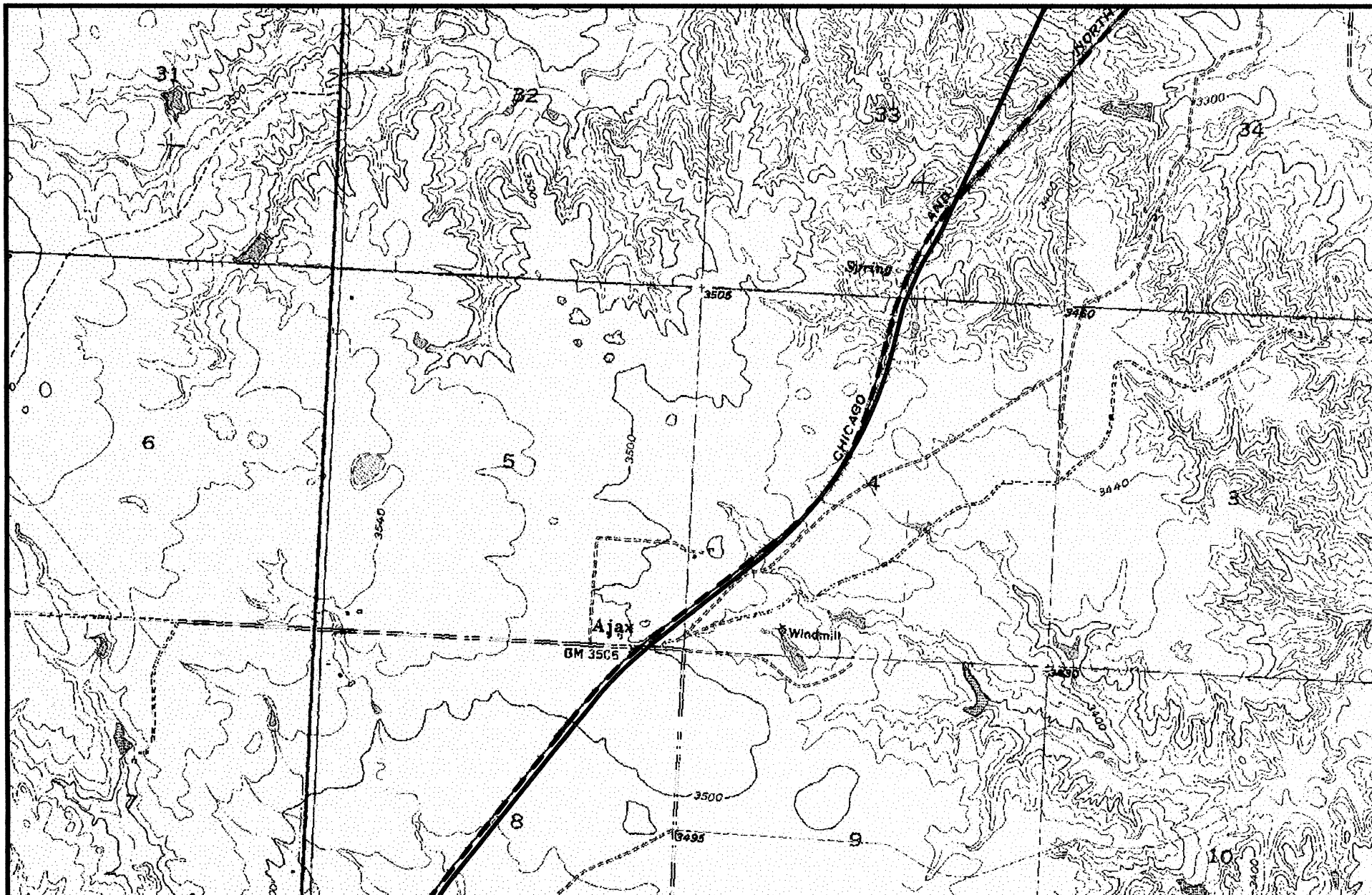
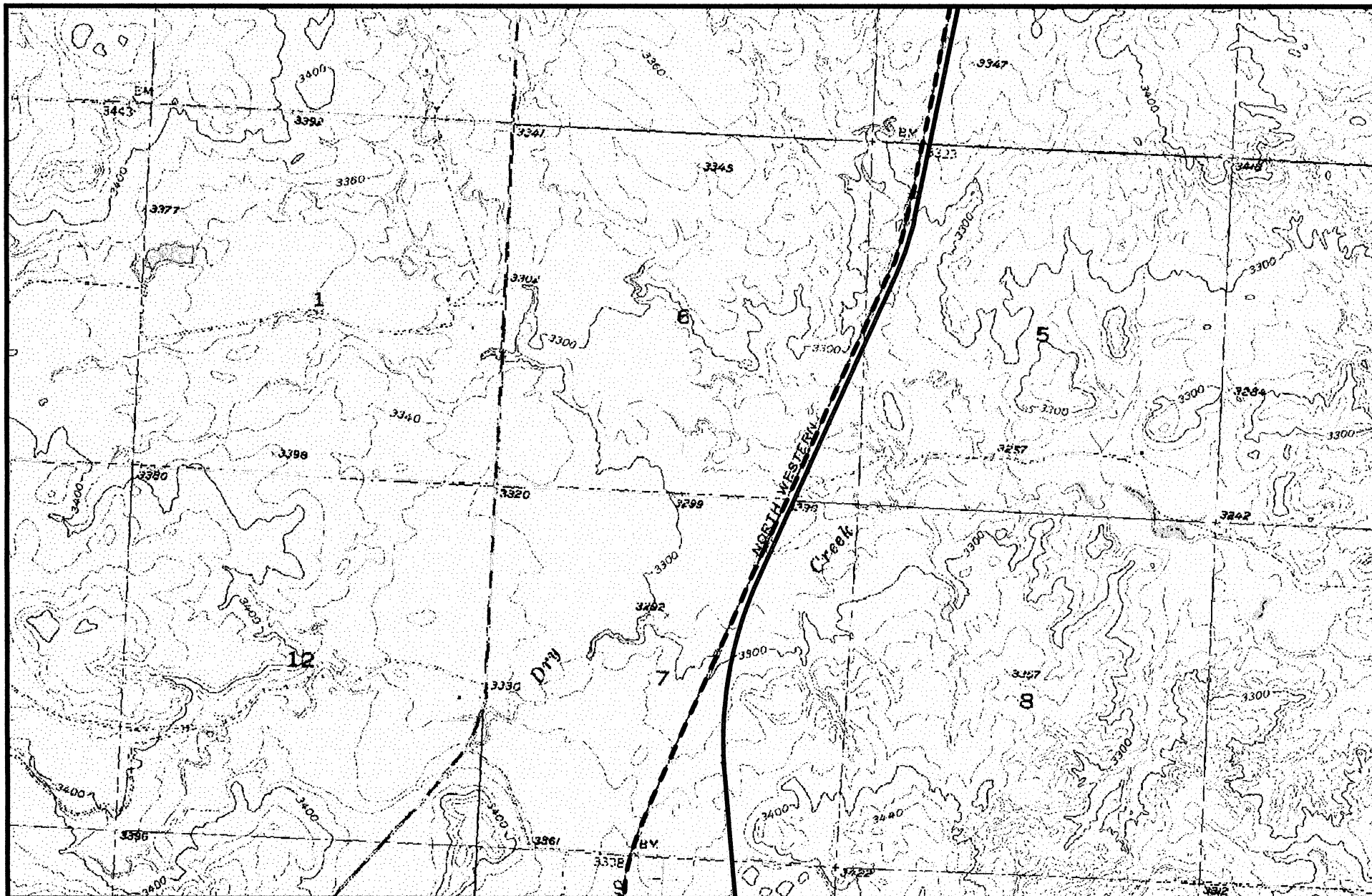


Figure 3-14
POWDER RIVER BASIN EXPANSION PROJECT
MODIFIED D ALTERNATIVE
PENNINGTON COUNTY, SD
HERMOSA NW QUAD

* Formerly Chicago and Northwestern Rail Line

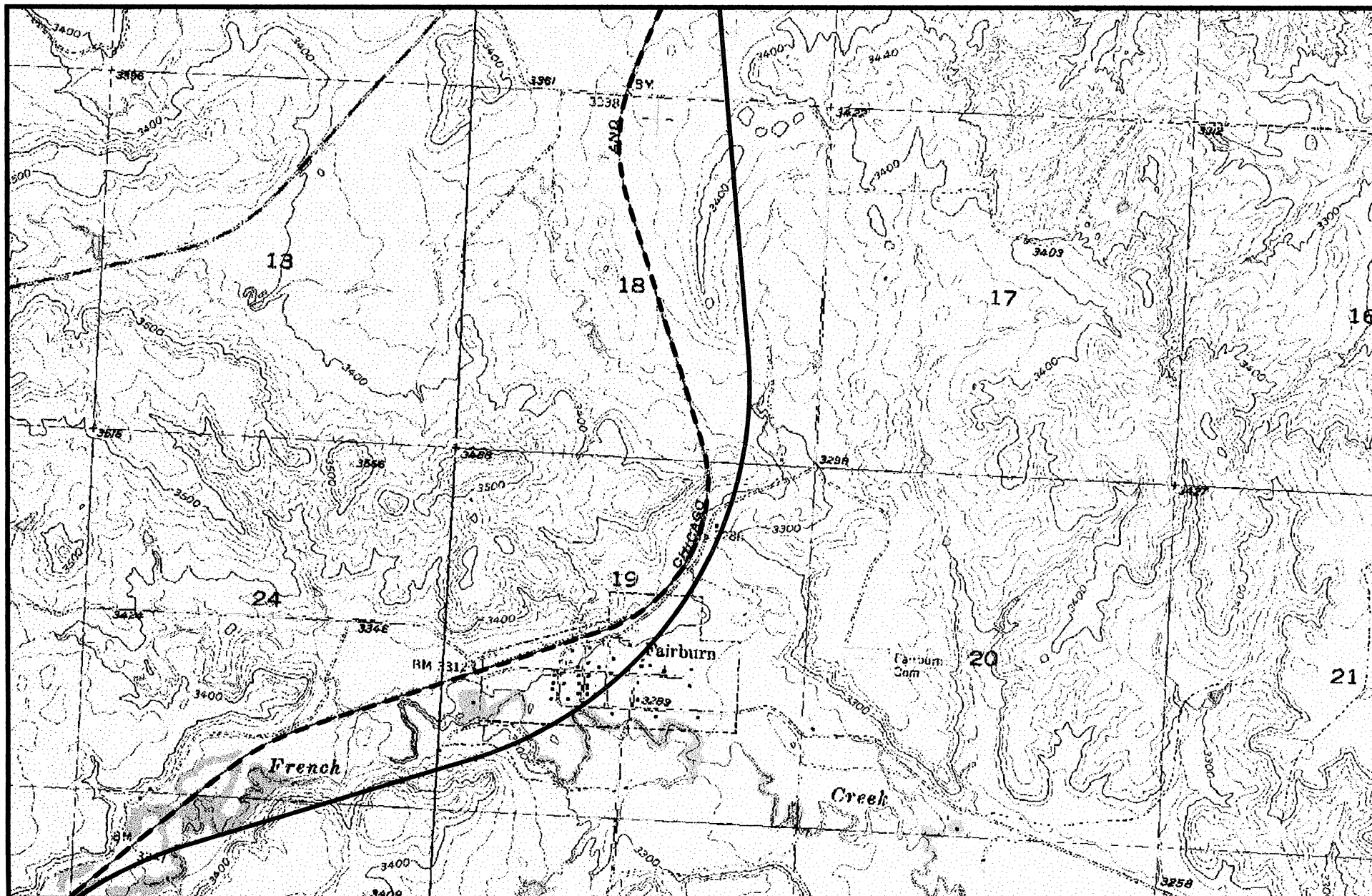


2000 0 2000 Feet

--- Alternative D/Existing Rail Line
 — Modified D

Figure 3-15
 POWDER RIVER BASIN EXPANSION PROJECT
 MODIFIED D ALTERNATIVE
 CUSTER COUNTY, SD
 FAIRBURN QUAD

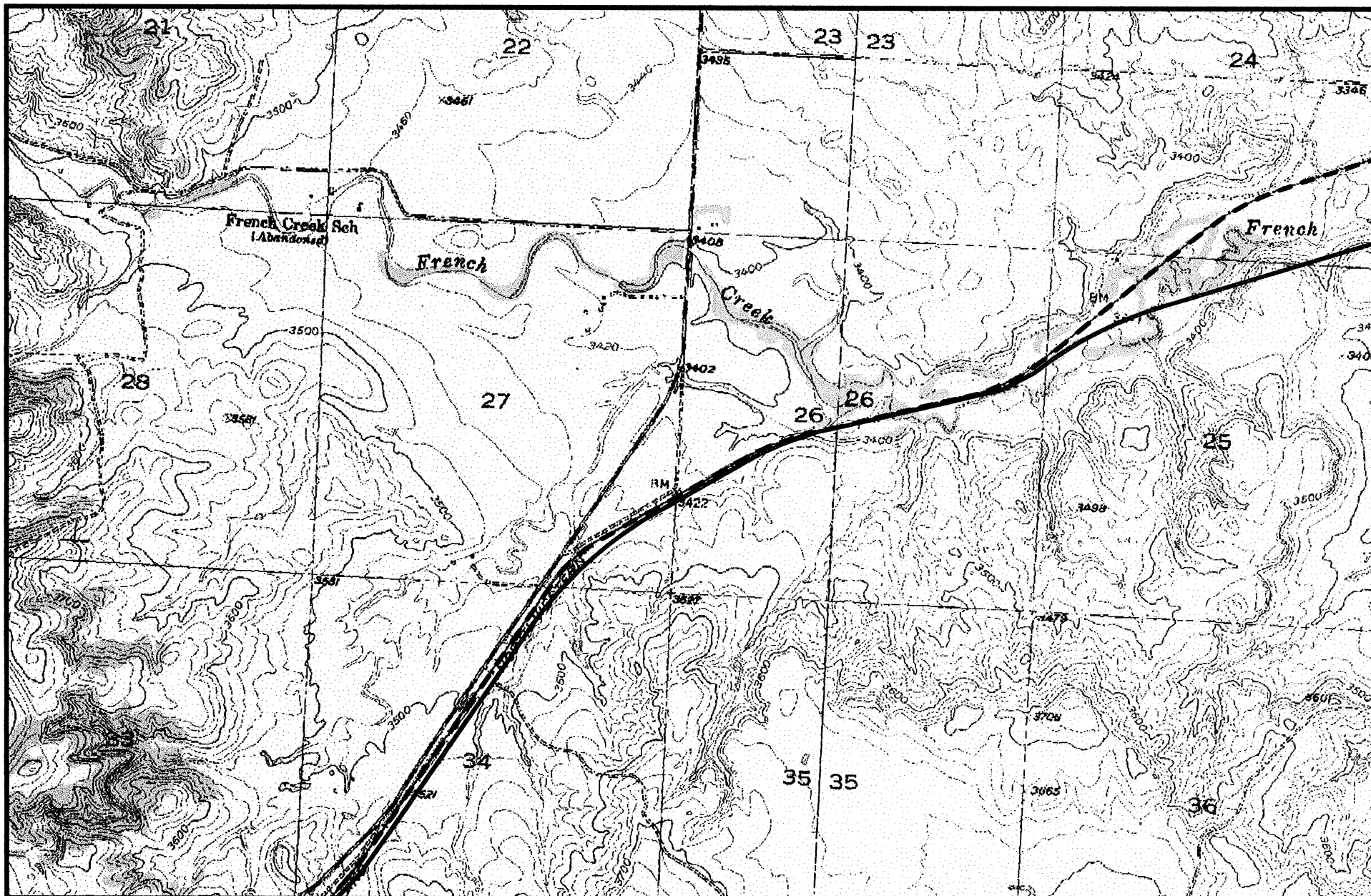
* Formerly Chicago and Northwestern Rail Line



--- Alternative D/Existing Rail Line
 — Modified D

Figure 3-16
 POWDER RIVER BASIN EXPANSION PROJECT
 MODIFIED D ALTERNATIVE
 CUSTER COUNTY, SD
 FAIRBURN QUAD

* Formerly Chicago and Northwestern Rail Line



- - - - - Alternative D/Existing Rail Line
 ————— Modified D

Figure 3-17
 POWDER RIVER BASIN EXPANSION PROJECT
 MODIFIED D ALTERNATIVE
 CUSTER COUNTY, SD
 BUTCHER HILL, FAIRBURN QUADS

* Formerly Chicago and Northwestern Rail Line

**Table 3-1
Modified Alternative D Segments**

Segment	Start	End
Edgemont Segment (3.8 miles)	Section 25, T9S, R3E at Plum Creek	SW corner of Section 15, T9S, R3E
Edgemont North Segment (6.9 miles)	SW corner of Section 15, T9S, R3E	Center of Section 26, T8S, R2E, near existing BNSF rail line
BNSF Segment (8.0 miles)	Center of Section 26, T8S, R2E, near BNSF rail line	NW corner of Section 25, T7S, R1E
Burdock School Segment (6.0 miles)	NW corner of Section 25, T7S, R1E	Section 15, T40N, R60W, south of Twenty One Divide, at WY/SD border
Wyoming Segment (43.9 miles)	Section 15, T40N, R60W, south of Twenty One Divide, at WY/SD border	North-center of Section 12, T42N, R67W, at Lion Creek
450 Segment (16.0 miles)	North-center of Section 12, T42N, R67W, at Lion Creek	Southeast corner of Section 29, T43N, R69W, south of Little Thunder Creek
South Arm (22.2 miles)	SE corner of Section 29, T43N, R69W, south of Little Thunder Creek	Section 2, T40N, R71W at Antelope coal mine
North Antelope East Mine Loop Alternative (1.5 miles)	NE corner of Section 34, T41N, R70W	NE corner of Section 27, T41N, R70W, west of Porcupine Reservoir upon joining existing spur to North Antelope/Rochelle coal mine
North Antelope West Mine Loop Alternative (2.4 miles)	Center of Section 32, T41N, R70W, north of Antelope Creek.	Between Sections 33 and 34, T41N, R70W, north of Antelope Creek upon joining existing North Antelope/Rochelle mine spur.
Black Thunder North Mine Loop Alternative (4.5 miles)	SE corner of Section 14, T43N, R70W	Section 17, T43, R70W at Black Thunder coal mine. Includes spur to serve Jacobs Ranch coal mine.

<p>Table 3-1 Modified Alternative D Segments</p>		
Segment	Start	End
Black Thunder South Mine Loop Alternative (7.1 miles)	SE corner of Section 14, T43N, R70W	Section 14, T43N, R70W at Jacobs Ranch coal mine and second spur in Section 17, T43N, R70W at Black Thunder coal mine.
North Rochelle Mine Spur - School Creek Option (4.1 miles)	NE corner of Section 6, T42N, R69W at School Creek Road.	Section 9, T42N, R70W, at North Rochelle coal mine.
North Arm (40.6 miles)	SE corner of Section 29, T43N, R69W, south of Little Thunder Creek.	Section 25, T48N, R71W at Caballo coal mine; includes spurs serving Caballo Rojo, Coal Creek, Cordero, and Belle Ayr coal mines.

Boxelder Creek Segment

The Boxelder Creek 44.9-mile segment would begin Modified D, generally following the existing DM&E rail line from Wall, South Dakota to about 3.0 miles east of Box Elder, South Dakota. This segment would begin approximately 1.0 mile north of Wall, at the point where the existing rail line turns south and passes through town. Rather than extend westward, it would continue on the existing DM&E line south, through the town of Wall and under I-90 southwest of town, following the existing rail alignment for about 3,000 feet past I-90. At approximately the east-center of Section 1, T1S, R15E, the Boxelder Creek Segment would branch from the existing DM&E rail line, continue westward along the north side of Bull Creek, 1,000 to 2,000 feet north of the existing rail alignment. It would cross under I-90, about 4.0 miles east of the interchange of I-90 with Jensen Road. This crossing would likely require raising I-90 as part of the construction of an underpass for the rail line.

The Boxelder Creek Segment would continue northwest, approximately 1,800 feet north of I-90. It would cross Anderson Hill Road in the northwest corner of Section 7, T1N, R15E. It would curve slightly to the west, crossing Jensen Road before rejoining the existing DM&E rail line approximately 2,000 feet north of where the existing rail line crosses the Cheyenne River in Section 2, T1N, R14E.

Relocation of the rail line right-of-way along this portion of the Boxelder Creek Segment would be necessary to straighten and flatten the rail line to the grade and curve requirements for this project. The existing rail line winds along Bull Creek, creating numerous sharp curves. The Bull Creek drainage is not wide enough to allow the rail line to be optimized and still accommodate the stream channel. In order to avoid relocating numerous miles of Bull Creek or placing it in a pipe or drainage ditch, the rail alignment had to be relocated out of the drainage and along the sideslope of the creek.

The Boxelder Creek Segment would generally follow the same alignment as the existing DM&E rail line westward to near Box Elder. After crossing the Cheyenne River, this segment would pass through the town of Wasta and under I-90. It would continue south along the west side of the Cheyenne River. At Boxelder Creek, this segment would turn west away from the river and follow the Boxelder Creek drainage. It would pass through the communities of Owanka and New Underwood, crossing Boxelder Creek numerous times. The Boxelder Creek Segment would end in the center of Section 26, T2N, R9E, approximately 3.0 miles east of the town of Box Elder.

Rapid City Bypass Segment

The Rapid City Bypass Segment was developed at the suggestion of EPA, to avoid both the operational problems associated with moving trains through Rapid City on the existing rail line and the potential environmental impacts associated with increasing train operations along the existing rail line. The 10.2-mile Rapid City Bypass Segment would begin about 3.0 miles east of Box Elder, curve to the southwest from the existing DM&E rail line, cross Boxelder Creek in the center of Section 27, T2N, R9E, continuing southwest, then cross Section 33 diagonally from the northeast corner to the southwest corner. Continuing southwest, it would pass through the northwest portion of Section 5, T1N, R9E, the southeast corner of Section 6 and the northwest corner of Section 7.

The segment would cross County Road 212, the southeast portion of Section 12, T1N, R8E, and Hawthorne Ditch in the southwest corner of the section, then County Roads C232 and T210 in the northwest corner of Section 13, T1N, R8E. It would traverse Section 14, T1N, R8E diagonally from northeast to southwest, crossing Murphy Ditch in the center of the section and State Route 40 and the abandoned Chicago, Milwaukee, and St. Paul Railroad grade in the southwest portion of the section. From there it would continue southwest, crossing Rapid Creek and Warren Lamb Road in the southwest corner of Section 14, then move through the southeast tip of Section 15 into Section 22. In the northeast corner of Section 22, it would cross Southside Ditch and the previous channel of Rapid Creek, then in the center of Section 22 it would curve south, crossing Cyclone Ditch and Dry Creek. The bypass would rejoin the existing DM&E rail

line in the center of Section 27, approximately 1.0 mile north of Warbonnet, just south of the crossing of Dry Creek.

Warbonnet Segment

The 56.5-mile Warbonnet Segment would begin about 1.0 mile north of Warbonnet at the point where the Rapid City Bypass Segment would rejoin the existing DM&E rail line, and extend south, between 2 and 3 miles east of State Route 79. It would pass through the towns of Hermosa, Fairburn, Buffalo Gap, and Oral. It would cross numerous drainages – Cheyenne River, Spring Creek, Battle Creek, French Creek, Lane Johnny Creek, Beaver Creek, and Sand Creek – several of them many times, and sections would be channelized or relocated to accommodate construction of an optimized rail line.

While the Warbonnet Segment would generally use the existing DM&E line, SEA determined that some areas would require reconstruction along new alignments to achieve design specifications for the project. Most would involve slightly straightening curves in small sections so that little new right-of-way would be required. However, at the crossing of Spring Creek and at Fairburn, more significant realignment would be required. Between the north and south banks of Spring Creek, the existing DM&E rail line describes a double “S” curve. New rail line would run through the middle of the “S” like the line through a dollar sign (\$). Another “S” curve in Fairburn would be reconstructed as a single curve, requiring the line to cross French Creek about 1.5 miles southwest of Fairburn, extend northeast on the south side of the creek, and cross the creek a second time just southwest of Fairburn. After passing through Fairburn, approximately 500 feet east of its present location, it would turn north to rejoin the existing rail line about 2.5 miles north of town.

Smithwick Segment

This 13.1-mile segment of Modified D would follow the same alignment as the Smithwick Segment described in the Draft EIS for Alternative B.

Tepee Creek South Segment

This 3.7-mile segment would follow the same alignment as described in the Draft EIS for the Tepee Creek South Segment for Alternative C.

Heppner Segment

This 3.1-mile Heppner Segment of Modified D would follow the Heppner Segment described in the Draft EIS for Alternative B.

Hat Creek North Segment

This 7.3-mile segment of Modified D would follow the same alignment as described in the Draft EIS for the Hat Creek North Segment of Alternative C.

Edgemont Segment

This 3.8-mile Edgemont Segment of Modified D would follow the Edgemont Segment described in the Draft EIS for Alternative B.

Edgemont North Segment

This 6.9-mile segment of Modified D would follow the same alignment as described in the Draft EIS for the Edgemont North Segment of Alternative C.

BNSF Segment

The 8.0-mile BNSF Segment of Modified D would follow the BNSF Segment described in the Draft EIS for Alternative B.

Burdock School Segment

The 6.0-mile Burdock School Segment of Modified D would follow the same alignment as described in the Draft EIS for the Burdock School Segment of Alternative C.

Wyoming Segment

This 43.9-mile segment of Modified D would follow the Wyoming Segment described in the Draft EIS for Alternative B.

450 Segment

This 16.0-mile 450 Segment of Modified D would be the same segment as the 450 Segment described in the Draft EIS for Alternative C.

South Arm Segment

The 22.2-mile South Arm Segment of Modified D would be the same segment as the South Arm Segment described in the Draft EIS for Alternative C.

North Antelope East Mine Loop Alternative

The 1.5-mile North Antelope East Mine Loop Alternative of Modified D would be the same segment as the North Antelope East Mine Loop Alternative described in the Draft EIS for Alternative B.

North Antelope West Mine Loop Alternative

The 2.4-mile North Antelope West Mine Loop Alternative of Modified D would be the same segment as the North Antelope West Mine Loop Alternative described in the Draft EIS for Alternative B.

North Arm Segment

The 45.0-mile North Arm Segment of Modified D would be the same segment as the North Arm Segment described in the Draft EIS for Alternative C.

Black Thunder North Mine Loop Alternative

This 4.5-mile alternative Segment of Modified D would be the same segment as the Black Thunder North Mine Loop Alternative described in the Draft EIS for Alternative C.

Black Thunder South Mine Loop Alternative

The 7.1-mile Black Thunder South Mine Loop Alternative segment of Modified D would be the same segment as the Black Thunder South Mine Loop Alternative described in the Draft EIS for Alternative C.

North Rochelle Mine Spur - School Creek Option

The 4.1-mile North Rochelle Mine Spur-School Creek Option of Modified D would be the same segment as the North Rochelle Mine Spur-School Creek Option described in the Draft EIS for Alternative C.

3.1.2.2 Development of Grade Profile for Modified D

After SEA and EPA approved the alignment of Modified D, DM&E developed plan and profile drawings showing waterway crossings and the limits of cut and fill. The extent of excavation and fill areas, and amounts of material to be excavated and filled was also calculated. SEA determined that the horizontal (route) and vertical (grade) alignments appeared to meet EPA's criteria for Modified D, and that the design represented a reasonable and credible effort to develop a heavy-haul rail line using the existing rail line alignment. SEA's further analysis of the information indicated the following regarding Modified D:

- The earthwork would be very unbalanced, with extensive cuts and excavation south of Rapid City to Smithwick and mostly fill from Rapid City to Wall.
- Excavation (133 million cubic yards) for Modified D would be about four times the fill (33 million cubic yards) required for it.⁶ Because it is unlikely a local or regional need could be identified for such a large quantity of fill material and it is generally uneconomical to transport fill more than a few miles, large areas would be required along the rail alignment for the disposal (dumping) of excess fill. Because of the distance between areas of cut and fill, even with all the excess excavated material, it is still likely that borrow areas from outside the right-of-way would be required to meet the local need for fill.
- Earthwork quantities (133 million cubic yards of excavated material and 33 million cubic yards of fill) appeared reasonable, based on the gradeline required for the rail line and the topography of the area. The existing line generally has a grade of 1.5 percent, with nearly 2 percent in some locations. Given the topography along the existing line, significant excavation would be required to reduce the gradeline to 1 percent compensated grade.

⁶ Since about 5 million cubic yards of material would fill the average football stadium, earthwork for this project would fill about 665 football stadiums with about 8.8 million large dump trucks of material.

- Earthwork quantities for Modified D were likely underestimated. They were developed using a standard rail bed cross-section, similar to those shown in Chapter 1 of the Draft EIS, using typical dimensions for a heavy-haul rail line, considering the width and height of the rail bed, subballast, ballast, rail, and drainage ditches, and assuming a standard 3:1 slope. From this standard template, the volume of cut and fill required to achieve the necessary grade was calculated. However, in many locations, cuts would be more than 100 feet deep, resulting in sideslopes of over 300 feet that would require benching (stair-stepping) the slope from the bottom to the top of the cut. Benching to stabilize sideslopes, reduce slope erosion, and allow for runoff draining into the cut likely would result in greater excavation than previously projected.
- Standard drainage ditches were used in preparing the engineering estimates, but in many cases cuts would intercept surface water, and streams would drain into the rail line cut. This would require larger ditches to accommodate the stream flow, wider at the bottom of the cut, which would increase the material excavated to establish stable sideslopes. Modifications to ditch sizes would also be needed to provide for snow removal from the rail line.
- No earthwork was calculated for reconstructing existing roadway alignments to the revised rail line grade level. If Modified D were approved and built, however, roads crossing the rail alignment might need to be raised or lowered to bring them to the same elevation as the rail line or to construct grade separations.
- Two existing Cheyenne River crossings would need to be raised over 40 feet, requiring substantial bridging and fill within the river flood plain at these locations.
- To develop a suitable alignment and grade, realignment would be necessary at Fairburn, South Dakota (Figure 3-16), moving the existing rail line several hundred feet east, through the middle of town. To achieve a suitable grade, the line would be atop 20-30 feet of fill, with a width-of-fill at the base of the rail bed of about 150 feet. A 25-foot-high wall would essentially divide Fairburn in half, and about 6.9 acres (10 percent) of town would be converted to rail line right-of-way.
- At many locations excavation for the Modified D Alternative would cut off creeks crossing the rail line so that the rail line cut would be lower than the creek bed and the creek would flow into the rail cut. In some cases, the creek would be conveyed in the cut for only a short distance before returning to the existing creek channel.

But there are cases where the depth of cut would require up to several miles of creek flow confinement in the cut. In all these areas, the creeks would be de-watered, impacting wetlands and water for wildlife and livestock, and making the water unavailable for irrigation.

- In several areas, cuts of 50 feet or greater for over 4 miles would be required, essentially creating a steep-sloped canyon along the rail line. Such cuts would drain runoff into the rail cut rather than streams and creeks, altering stream hydrologies, resulting in less water in some locations for wetlands, wildlife, livestock, and irrigation. Areas below the return of streams to their channels would experience increased flows, and sediment transport and deposition. Wildlife funneled into these areas would be more easily struck by a passing train since steep slopes and the length of the cuts provide no convenient escape route.
- Modified D's estimated 133 million cubic yards of earthwork is many times more than Alternative B (11 million cubic yards) and Alternative C (17 million cubic yards) require. Differences in cut and fill, and the bridges, stream channelization, drainage structures, slope stabilization, and erosion control would likely result in significant cost differences between these alternatives as well. Alternative B is estimated to cost \$430 million and Alternative C \$685 million, but Modified D is estimated to cost \$2 billion to construct. And because of the cut-and-fill understatement and road reconstruction for Modified D, the actual cost of construction of Modified D is likely to be substantially higher than \$2 billion.
- Even using the alignment of Alternative C in Wyoming and the bypass of Rapid City, Modified D would be 85.7 and 85.9 miles longer than Alternatives B and C, respectively, offering no operational advantages over the other alternatives. Travel distance, travel time, fuel consumption and associated emissions, rail line maintenance, and wear and tear on locomotives and rail cars would all be increased. The additional length of the rail line would also likely require additional passing sidings along the entire DM&E mainline.

SEA had eliminated Alternative D-6 (basically the same as Modified D without the Rapid City bypass) from detailed consideration in the Draft EIS because it would not avoid new rail construction in the National Grasslands, offer a shorter or more competitive route into the PRB, or provide construction or operational advantages over Alternatives B and C. EPA did not indicate that Modified D would alleviate SEA's concerns about these issues, only that it might reduce the environmental impacts of Alternative C. SEA has determined that Modified D would save

approximately 75 miles over Alternative D (from Edgemont to Black Thunder Mine, 82.8 miles for Alternative C versus 158.2 miles for Alternative D). There would be no impacts to communities along the BNSF line such as Newcastle, Moorcroft, and Upton, and bypassing Rapid City would also eliminate many potential impacts to human resources from increased train operations there. However, Modified D would still be about 85.9 miles longer than Alternative C.

3.1.2.3 SEA's Conclusion on Modified D

Based on the previous considerations, SEA has determined that Modified D would have significant environmental impacts, many of them difficult or impossible to mitigate. The primary attraction of Alternative D and Modified D is using DM&E's existing line. But a thorough analysis indicates that many of the potential benefits of using the existing rail corridor would be lost, due to the extent of new construction and the new right-of-way that would be required, and the potential environmental impacts of the required construction. Modified D offers no advantages over Alternatives B or C – such as reduced distance, fewer environmental impacts, lower cost, or less complicated engineering – and the existing alignment could not reasonably be optimized for unit-coal transport. Modified D also does not avoid the Thunder Basin National Grassland in Wyoming, although the Buffalo Gap National Grassland would be avoided. Therefore, SEA has concluded that neither Alternative D, nor Modified D, is a reasonable and feasible alternative, and has consequently eliminated them from further consideration in this Final EIS.

SEA has worked closely with EPA in conducting this additional analysis, and after concluding that Modified D would result in potentially severe environmental impacts, discussed with EPA the results of its analysis. After considering SEA's results, EPA has concurred that Modified D is not a reasonable and feasible alternative for this project, (see Appendix C). EPA also agreed that, with the elimination of the Modified D Alternative, a Supplemental Draft EIS is no longer necessary.

3.2 ENVIRONMENTAL IMPACTS OF EXTENSION ALTERNATIVES

In the Draft EIS, SEA analyzed the potential environmental impacts of extending DM&E's existing rail line from Wall, South Dakota, westward to the mines in the PRB, by evaluating the impacts of Alternatives B, C, and the original D, on a variety of natural and human resources. Nothing in the comments to the Draft EIS led SEA to modify its conclusion that the original D Alternative would not be reasonable and feasible, and, as discussed above, the Modified D Alternative also has been carefully assessed, but eliminated from further consideration.